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Cheatography

Axioms For Vector Spaces

To show that a given set with two operations is **NOT** a vector space, we need to show properly that at least one property of the ten above is violated.

(1) If $\mathbf{u}, \mathbf{v} \in V$, then $\mathbf{u} \oplus \mathbf{v} \in V$ [CLOSURE UNDER ADDITION]

(2) If u \oplus v = v \oplus u [COMMMUTATIVE LAW]

(3) If (**u**⊕**v**)⊕**w**=**u**⊕(**v**⊕**u**) ['⊕' IS ASSOCI-ATIVE]

(4) V contains the object "0" which satisfies $\mathbf{u} \oplus 0 = 0 \oplus \mathbf{u}$

For each u∈V, there exist an object '-u' such that u⊕-u=0 [ADDITIVE INVERSE]

(6) If u∈V*and k∈K, then k⊙u∈V [CLOSURE UNDER MULTIPLICATION]

(7) k \odot (u \oplus v)=(k \odot u) \oplus (k \odot v) [DISTRIBUTIVE LAW]

(8) (k+l)⊙**u**=(k⊙**u**)⊕(**l**⊙**u**)

(9) k⊙(l⊙u)=(kl⊙u)

(10) 1⊙**u=u**

By **Kyyul**

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